

Amendments to the Specification:

On page 1, at line 3, insert the following paragraph:

This application claims benefit of priority to French Patent Application No. FR 0216540 filed December 23, 2002.

On page 1, please replace the heading at line 3 with the following amended heading:

~~Technical field and prior art~~
TECHNICAL FIELD

On page 1, please insert the following heading at line 16:

BACKGROUND

On page 5, please insert the following heading at line 4:

SUMMARY

On page 7, please insert the following heading at line 33:

BRIEF DESCRIPTION OF THE DRAWING

On page 8, at line 1, please replace the paragraph with the following amended paragraph:

[-] ~~figure~~ FIG. 1 is a diagram of a first step of the method of the invention in which a mold is positioned on a layer formed on a substrate,

On page 8, at line 4, please replace the paragraph with the following amended paragraph:

[-] ~~figure~~ FIG. 2 is a diagram of a second step in which the mold is pressed into the layer as far as a stop sub-layer,

On page 8, at line 7, please replace the paragraph with the following amended paragraph:

[-] ~~figure~~ FIG. 3 is a diagram of a third step in which, following removal of the mold, the stop sub-layer is attacked,

On page 8, at line 10, please replace the paragraph with the following amended paragraph:

[-] ~~figure~~ FIG. 4 is a diagram of a fourth step in which the substrate is etched, and

On page 8, at line 12, please replace the paragraph with the following amended paragraph:

[-] ~~figure~~ FIG. 5 is a graph of the residual thickness after pressing the mold as a function of the characteristics of the pattern to be reproduced.

On page 8, at line 15, please replace the paragraph with the following amended paragraph:

~~Figures~~ FIGs. 1 to 4 represent four stages of the method of the invention, using a substrate 1 on which a layer 2 has been formed, and a mold 3 with a pattern formed of protrusions 4 and recesses 5 defining a pattern in accordance with which the substrate is to be etched. Here the substrate and the mold are made from the same material, for example silicon.

On page 8, at line 22, please replace the paragraph with the following amended paragraph:

~~Figure~~ FIG. 1 represents a step in which the layer 2 has been formed on the substrate in the form of two sub-layers, namely an internal sub-layer 2A and an external layer 2B, and in which the mold 3 is positioned on this layer, at the moment of commencing pressing.

On page 8, at line 27, please replace the paragraph with the following amended paragraph:

The internal sub-layer 2A layer is formed of a curable material. It is first formed on the free surface of the substrate (with or without a native oxide layer), and then treated to cure it.

On page 8, at line 31, please replace the paragraph with the following amended paragraph:

~~This~~ The material of the internal layer may be a polymer or any other material softer than the material of the substrate (at least in its surface portion). In the case of a polymer, the curing treatment is a heat treatment at a temperature higher than its curing temperature. This polymer is preferably chosen to have a glass transition temperature higher than the temperature at which the pressing is to be conducted. It is additionally selected so that, after pressing, it can be ~~attacked etched~~ to expose the surface of the substrate locally, for example by means of an oxygen plasma. It is advantageously a resin that can be cross-linked.

On page 9, at line 8, please replace the paragraph with the following amended paragraph:

After the curing treatment of ~~this~~ the lower sub-layer 2A, there is formed on the cured layer the external sub-layer 2B that is to constitute the external portion of the coating of the substrate.

On page 9, at line 12, please replace the paragraph with the following amended paragraph:

~~This~~ The external sub-layer 2B is made from any appropriate known material, for example a thermoplastic polymer, capable of being deformed, where applicable after heating it to above a softening threshold. It may be a polymer or a resin that can be cross-linked.

On page 9, at line 29, please replace the paragraph with the following amended paragraph:

In practice, whether the external sub-layer 2B is of the same material as the ~~lower~~ internal sub-layer 2A or not, it is advantageously subjected to a standard treatment, involving a heat treatment, that is insufficient to induce curing but sufficient to stabilize the polymer.

On page 9, at line 34, please replace the paragraph with the following amended paragraph:

~~Figure~~ FIG. 2 represents a stage in which pressing has taken place (where applicable after heating) and has continued until the protrusions of the mold have come into contact with the ~~stop~~ internal sub-lay layer 2A. This stop layer has a damping function during pressing.

On page 10, at line 4, please replace the paragraph with the following amended paragraph:

It is seen that the recesses of the mold, between the protrusions, are incompletely filled with the material constituting the external sub-layer 2B. This is because the recesses of the mold have a depth that is greater than the thickness of the external sub-layer 2B, which prevents the penetration of the protrusions 4 of the mold 3 into ~~this~~ the sub-layer 2A being blocked by the beads 2C of material forced into the recesses. Accordingly, regardless of the density of the patterns of the molds, i.e. whether they are isolated or densely packed, pressing can easily be effected over the whole of the substrate, even if it is large. After it has been cured, the ~~stop~~ internal sub-layer 2A is sufficiently hard to resist penetration by the protrusions but remains sufficiently elastic to absorb the applied pressure. It is guaranteed that all the protrusions come to a given distance from the surface of the substrate (equal to the thickness of the ~~stop~~ sub-layer 2A - see also ~~figure~~ FIG. 5), without any attendant risk of contact between the mold 3 and the substrates, and therefore of mutual damage of these elements.

On page 10, at line 35, please replace the paragraph with the following amended paragraph:

~~Figures FIGs.~~ 3 and 4 represent the remainder of the method of etching the substrate 1, comprising steps known in the art.

On page 11, at line 3, please replace the paragraph with the following amended paragraph:

~~In figure FIG.~~ 3, the mold has been removed, leaving only the beads of the material of the sub-layer that have formed in the recesses of the mold 3. Using ~~these~~ beads as an attacking etching mask, the stop layer has been attacked etched, for example by means of an oxygen plasma (the substrate being of silicon), to expose the substrate locally portions.

On page 11, at line 9, please replace the paragraph with the following amended paragraph:

~~In figure FIG.~~ 4, the recesses formed in the stop layer have been used as a mask for attacking etching the substrate, by any appropriate means known in the art, such as the plasma attack etching process conventionally used in lithography, in accordance with a pattern that is defined by that of the mold, in the sense that, the The recesses of the substrate correspond very precisely to the protrusions of the mold.

On page 11, at line 22, please replace the paragraph with the following amended paragraph:

~~Figure FIG.~~ 5 represents the results obtained with diverse configurations: a set of lines in the mold whose width L varies from 0.35 microns to 0.5 microns, a thickness E between the lines that varies from 0.35 microns to 0.5 microns following pressing at 15 bar for 10 minutes at 140°C, the external and lower sub-layers being of the same negative resin. When the residual thickness of the stop sub-layer finally obtained after contact of the mold with that sub-layer is measured, it is seen that,

despite a few fluctuations that may be attributed to different possibilities of local crushing between the regions in question, it remains substantially uniform from one line to another, included in all cases in a range of the order of from 40 nanometers to 60 nanometers; this also establishes that the thickness of this stop sub-layer may be as little as a few tens of nanometers, which is very thin. In this example:

On page 12, at line 4, please replace the paragraph with the following amended paragraph:

the thickness of the initial external layer: is 100 nm

On page 12, at line 5, please replace the paragraph with the following amended paragraph:

and the depth of the patterns of the mold: is 250 nm